IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	: 10/628,307	Confirmation No.	: 4469
First Named Inventor	: Jobst La DOUS		
Filed	: July 29, 2003		
TC/A.U.	: 1712		
Examiner	: J. Figueroa		
Docket No.	: 100341.52572US		
Customer No.	: 23911		
Title	: Photochromic Plastic Object		

AMENDMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria , VA 22313-1450

Sir:

The following proposed amendments and remarks are respectfully submitted in response to the Office Action dated January 29, 2007. An extension of the deadline for response to the Office Action is respectfully requested pursuant to 37 C.F.R. § 1.136(a) and the appropriate fee is submitted herewith.

Amendments to the Claims are reflected in the listing of claims beginning on page 2 of this paper.

Remarks begin on page 4 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously presented) A photochromic plastic object comprising a transparent synthetic resin body composed of at least two interpenetrating polymer networks of different polymer materials and at least one photochromic dye homogeneously distributed therein, wherein one of the at least two interpenetrating polymer networks is composed of polyurea or polyurethane and wherein a second one of the at least two interpenetrating polymer networks is composed of polyacrylate, polymethacrylate or a mixture thereof.

2. (Cancelled)

3. (Cancelled)

4. (Previously presented) A method of producing a transparent synthetic resin body composed of at least two interpenetrating polymer networks of different polymer materials and at least one photochromic dye homogeneously distributed therein, said method comprising

initially producing a first polymer network composed of a first polymer material;

subsequently producing a second polymer network composed of a second polymer material different from said first polymer material in such a way that the two networks of different polymer materials interpenetrate, and

adding the at least one photochromic dye before or during polymerization

to form a transparent synthetic resin body composed of at least two interpenetrating polymer networks of different polymer materials and at least one photochromic dye homogeneously distributed therein.

5. (Original) A method according to claim 4, wherein said first polymer network is produced without using an initiator.

6. (Original) A method according to claim 4, wherein the first polymer network is produced by a polyaddition reaction, and the second polymer network is produced by thermal, radical or UV-light initiated polymerization.

7. (Original) A method according to claim 6, wherein the polyaddition reaction is carried out at room temperature and without using an initiator.

8. (Original) A composite comprised of a photochromic plastic object according to claim 1, and at least one inorganic material.

9. (Previously presented) A photochromic plastic object according to claim 1, wherein the object is selected from the group consisting of lenses, visors, and window glazings.

10. (Original) A photochromic plastic object comprising a transparent synthetic resin body composed of at least two interpenetrating polymer networks of different polymer materials and at least one photochromic dye homogeneously distributed therein, wherein the at least one photochromic dye is introduced to the polymer networks by a mass dyeing process.

11. (Currently amended) A method according to Claim 6, comprising forming the body simultaneously with the steps of producing the networks ~~a first polymer network and producing a second polymer network~~ .

REMARKS

Favorable consideration and allowance are respectfully requested for claims 1 and 4 - 11 in view of the foregoing amendments and the following remarks.

The Examiner is thanked for the careful review and consideration of this case and the courtesies extended during the interview held May 3, 2007, the substance of which is reflected herein. The Examiner is also thanked for the indication that claim 7 is directed to allowable subject matter - as discussed during the interview and the earlier Office Actions.

The rejection of claim 11 under 35 U.S.C. § 112, second paragraph, as indefinite, is respectfully traversed.

Claim 11 is amended to clarify the phrase "simultaneously with the steps of producing a first polymer network and producing a second polymer network." Instead, the claim now recites "simultaneously with the steps of producing the polymer networks." The claim is thus directed to an embodiment where the transparent synthetic resin body is formed as the two polymer networks, i.e., the first polymer network and second polymer network, are formed. Therefore, one of skill in the art could readily determine whether or not some activity constitutes infringement of this claim. In any event, there is nothing about the claim language that is "insolubly ambiguous", see *Marley Mouldings Ltd. v. Mikron Industries, Inc.*, 417 F.3d 1356, 75 U.S.P.Q.2d 1954, (Fed. Cir. 2005) citing *Bancorp Servs., L.L.C. v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1372, 69 USPQ2d 1996, (Fed. Cir. 2004). Accordingly, this claim language is definite and reconsideration and withdrawal of this rejection are respectfully requested.

The rejection of claims 1 and 4-11 under 35 U.S.C. § 103(a), as obvious over Sommerfeld, in view of the allegedly admitted prior art, is respectfully traversed. As discussed during the interview, the inclusion of claim 7 in this rejection appears to be in error. See, for instance, the Office Actions of October

18, 2005 and July 18, 2006, which did not reject claim 7 as obvious over Sommerfeld.

The present invention relates to photochromic plastic objects and methods of forming photochromic plastic objects composed of at least two interpenetrating polymer networks and at least one photochromic dye *homogeneously distributed* therein. The Sommerfeld reference simply does not disclose or suggest an object with a photochromic dye distributed *homogeneously* throughout two interpenetrating networks.

At least one of the interpenetrating polymer networks disclosed by Sommerfeld ***must*** be formed by polymerization in a solvent (see, for instance, the abstract of Sommerfeld, stating "[a]t least one of the polymer networks is formed by polymerization in a solvent"; see also the summary of the invention stating: "at least two polymer networks . . . with the proviso that at least one of the polymer networks is formed by polymerization in a solvent . . . ."

In particular, Sommerfeld relates to dispersions of polymer networks dissolvable in organic solvents and adopted for films having a thickness in the range of micrometers. The present invention, on the other hand, relates to a solid, crosslinked polymer having a thickness in the range of millimeters. The inventive solid, crosslinked polymer is not dissolvable in common solvents.

A person of skill in the art would not properly consider Sommerfeld's solvent-based cleavage of acrylate or polyurethane bonds as a "solution." Further, if, as proposed in the Office Action, one were to dissolve the networks of Sommerfeld in a solvent and add a photochromic dye and then evaporate the solvent, the dye would not be distributed *homogeneously* throughout two interpenetrating networks. Instead, the dye would be present on the outer surfaces of the dissolved polymeric particles. Even this distribution of the dye to the outer surface of the dissolved polymeric particles would be limited because the solvent would not completely dissolve the network back to the monomeric particles. As a result, the dye could not be homogenously dispersed in all of the voids of the polymeric network. In fact, a process as contemplated by the Office

Action would most likely lead to an agglomeration or crystallization of the photochromic dye rather than a homogenous dispersion of the dye throughout the two interpenetrating networks.

If a person of skill in the art were to try to use photochromic dyes with the process described in Sommerfeld, he would, for instance try to replace the green dye of Examples 2 - 6 with a photochromic dye. In this instance, the majority of the polymer is present as a macromer (MMA/MAA/EGDMA or BMA/HEMA/MAA or similar polyvinylpyrolidone, having a molecular weight of approximately 50,000) and this macromer is dispersed in solvent, and not actually dissolved. The dispersion is then cast to a film. After evaporation, of the solvent, the dye attaches to the outer surfaces of the macromers.

Macroscopically, this process might appear to yield a result similar to a homogenous distribution of the photochromic dye in two interpenetrating polymer networks, but microscopically, there is no homogenous distribution of the dye throughout the two polymer networks. Moreover, as a result of kinetic properties, i.e., the lightening and darkening rate, the darkening depth and the temperature dependence, the resulting color and color change properties of the photochromic dyes would be different, given the different locations of the dye. That is, given the differences in the conditions on the surface of the monomer vs. those inside a mutually interpenetrating network of two monomers, the photochromic properties of the films of Sommerfeld would be quite different from the solid photochromic bodies of the presently claimed invention.

As described in the recent Office Action, "Sommerfeld discloses that . . . dyes are added to the interpenetrating networks" *see*, for instance, page 3 of the Office Action. Page 4 of the Office Action indicates that "Sommerfeld fails to teach that the dyeing process is accomplished through a mass dyeing process wherein the dye is added prior or during the polymerization reaction." Applicants again respectfully submit that once a polymer network is formed, it is impossible to homogenously distribute any dye throughout the network. The dye

must be present before the mixture is formed into a polymeric network so that the dye may be mixed in.

In paragraph 8 of the previously-submitted declaration, Jobst La Dous explains that to homogenously distribute the dye within the resin, the dye is introduced to the polymer network before or during polymerization. Paragraph 9 explains that if mass dying is used, no solvent may be present.

Thus, the present record shows that in order to create an object composed of at least two interpenetrating polymer networks and at least one photochromic dye *homogeneously distributed* therein, the dye must be present before or during polymerization and there must not be a solvent. As a result, because the claims require a homogenously distributed photochromic dye, the claims (1) exclude processes where a solvent is used in the polymerization and (2) require that the dye is present before or during the polymerization.

The methods of Sommerfeld ***require*** a solvent in the formation of at least one of the networks. As a result, these methods will never achieve an object with a homogenously distributed photochromic dye, as is presently claimed.

Any person trying to create an object composed of at least two interpenetrating polymer networks and at least one photochromic dye *homogeneously distributed* therein would have to chose to disregard the explicit requirements of the Sommerfeld reference, because the reference explicitly requires a solvent. The primary reference relied on in the rejection, Sommerfeld, actually teaches away from the presently claimed invention. There is nothing in the present record that would provide one of skill in the art any motivation to select certain portions of the teachings of Sommerfeld and follow those instructions, and then disregard other explicit requirements of the reference.

Accordingly, based on Sommerfeld, one of skill in the art would never arrive at the presently contemplated invention. If one of skill in the art were, for instance, to contemplate combining a mass dyeing technique with the teachings of Sommerfeld, such a person would quickly disregard this potential

combination, because Sommerfeld is limited to solvent-based production methods.

Each of the claims are directed to a transparent synthetic resin body composed of at least two interpenetrating polymer networks of different polymer materials and at least one photochromic dye homogeneously distributed therein, or a method of forming such a body. Because the teachings of Sommerfeld could never achieve such a body, and because the teachings of Sommerfeld require a solvent-based process, the proposed combination of Sommerfeld with mass dying is improper. In particular, to arrive at the presently claimed invention, one of skill in the art would have to disregard the express requirements of the primary reference. Accordingly, because the proposed combination is improper, the obviousness rejection cannot be properly maintained.

Reconsideration and withdrawal of this rejection are therefore respectfully requested.

CONCLUSION

In view of the foregoing, the application is respectfully submitted to be in condition for allowance, and prompt favorable action thereon is earnestly solicited.

If there are any questions regarding this response or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket # 100341.52572US).

Respectfully submitted,

July 30, 2007

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